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AUTOMATIC FREQUENCY CONTROL OF
GMSK TIME-DISPERSIVE CHANNELS

ABSTRACT OF THE DISCLOSURE

5   A GMSK modulated signal has a voice/data signal minimum shift key (MSK) modulated in time slots of the carrier signal. A mixing signal is used to demodulate at least part of the voice/data signal from the carrier signal for each time slot. A plurality of amplitude and phases of the demodulated voice/data signal are converted into a plurality of received quadrature data. The received quadrature data is processed to determine a frequency slope error value, a binary cyclical redundancy check (CRC) value, an average signal-to-noise ratio (SNR) value, a received signal strength indicator (RSSI) value, and a sequence of digital bits forming at least part of the voice/data signal. The frequency slope error value is weighted with a first weighting value or a second weighting value when the binary CRC value is in its first binary state or its second binary state, respectively, to produce a weighted frequency slope error value. The first weighting value includes the combination of the SNR value and the RSSI value and the second weighting value zeroes the frequency slope error value. An average weighted frequency slope error value is determined for a plurality of time slots of the carrier signal. An average weight value is determined from the first weighting value and/or the second weighting value for the plurality of time slots. For each time slot, the average weighted frequency slope error value and the average weight value are combined to obtain an unweighted frequency error value. The unweighted frequency error value is utilized to adjust a frequency of the mixing signal to obtain frequency synchronization and frame synchronization with the GMSK modulated signal.